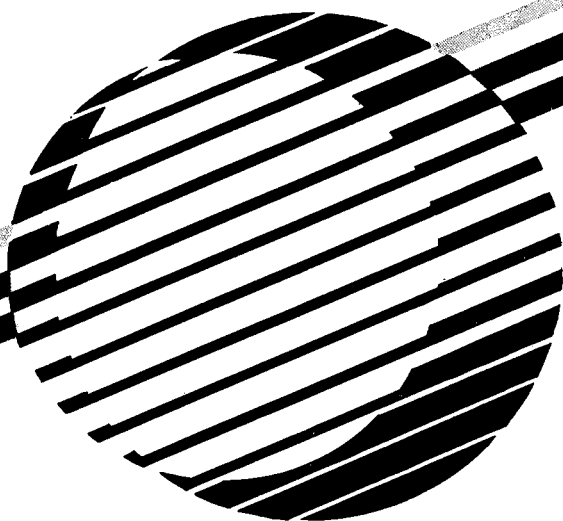


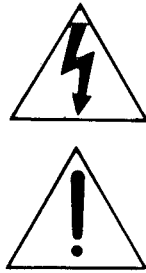
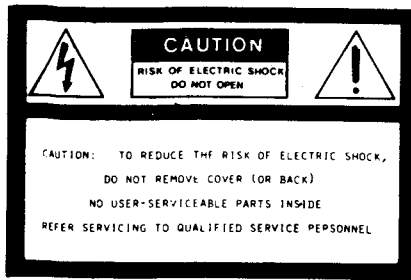


AM/FM DIGITAL
SYNTHESIZER TUNER



TD 120//120B

INSTALLATION and OPERATION MANUAL



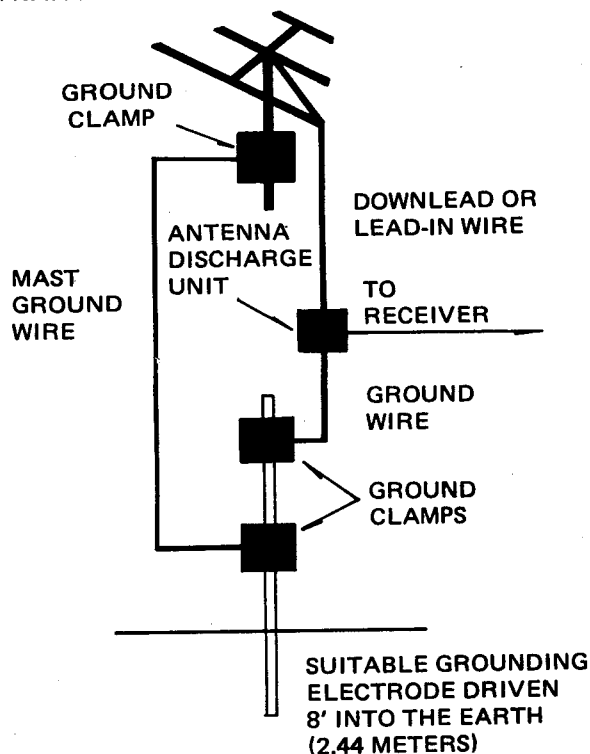
The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

SAFETY INSTRUCTIONS

1. **READ INSTRUCTIONS** — All the safety and operating instructions should be read before the appliance is operated.
2. **RETAIN INSTRUCTIONS** — The safety and operating instructions should be retained for future reference.
3. **HEED WARNINGS** — All warnings on the appliance and in the operating instructions should be adhered to.
4. **FOLLOW INSTRUCTIONS** — All operating and use instructions should be followed.
5. **WATER AND MOISTURE** — The appliance should not be used near water — for example near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool, etc.
6. **VENTILATION** — The appliance should be situated so that its location or position do not interfere with its proper ventilation. For example, the appliance should not be situated on a bed, sofa, rug, or similar surface that may block the ventilation openings; or, placed in a built-in installation such as a bookcase or cabinet that may impede the flow of air through the ventilation openings.
7. **HEAT** — The appliance should be situated away from heat sources such as radiators, heat registers, stoves, or other appliances (including amplifiers) that produce heat.
8. **POWER SOURCES** — The appliance should be connected to a power supply only of the type described in the operating instructions or as marked on the appliance.
9. **POWER-CORD PROTECTION** — Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the appliance.
10. **CLEANING** — The appliance should be cleaned only as recommended by the manufacturer.
11. **POWER LINES** — An outdoor antenna should be located away from power lines.
12. **OUTDOOR ANTENNA GROUNDING** — If an outside antenna is connected to the appliance, be sure the antenna system is grounded so as to provide some protection against voltage surges and built up static charges. Section 810 of the National Electrical Code, ANSI/NFPA No. 70-1978, provides information with respect to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna-discharge unit, connection to grounding electrodes, and requirements for the grounding electrode. The Example shown here is for an FM/TV antenna installation. However, the basic grounding circuit and conductor size will also apply to external AM antenna installations.

**EXAMPLE OF ANTENNA GROUNDING AS
PER NATIONAL ELECTRICAL CODE INSTRUCTIONS**



- C. The appliance has been exposed to rain; or
- D. The appliance does not appear to operate normally or exhibits a marked change in performance; or
- E. The appliance has been dropped, or the enclosure damaged.

16. **SERVICING** — The user should not attempt to service the appliance beyond that described in the operating instructions. All other servicing should be referred to a qualified service personnel.

- a. Use No. 10 AWG copper or No. 8 AWG aluminum or No. 17 AWG copper-clad steel or bronze wire, or larger as ground wires for both mast and lead-in.
 - b. Secure lead-in wire from antenna to antenna discharge unit and mast ground wire to house with stand-off insulators, spaced from 4 feet (1.22 meters) to 6 feet (1.83 meters) apart.
 - c. Mount antenna discharge unit as closely as possible to where lead-in enters house.
13. **NONUSE PERIODS** — The power cord of the appliance should be unplugged from the outlet when left unused for a long period of time.
14. **OBJECT AND LIQUID ENTRY** — Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.
15. **DAMAGE REQUIRING SERVICE** — The appliance should be serviced by qualified service personnel when:
- A. The power-supply cord or the plug has been damaged; or
 - B. Objects have fallen, or liquid has been spilled into the appliance; or

Unpacking and Installation

Congratulations on Your Purchase!

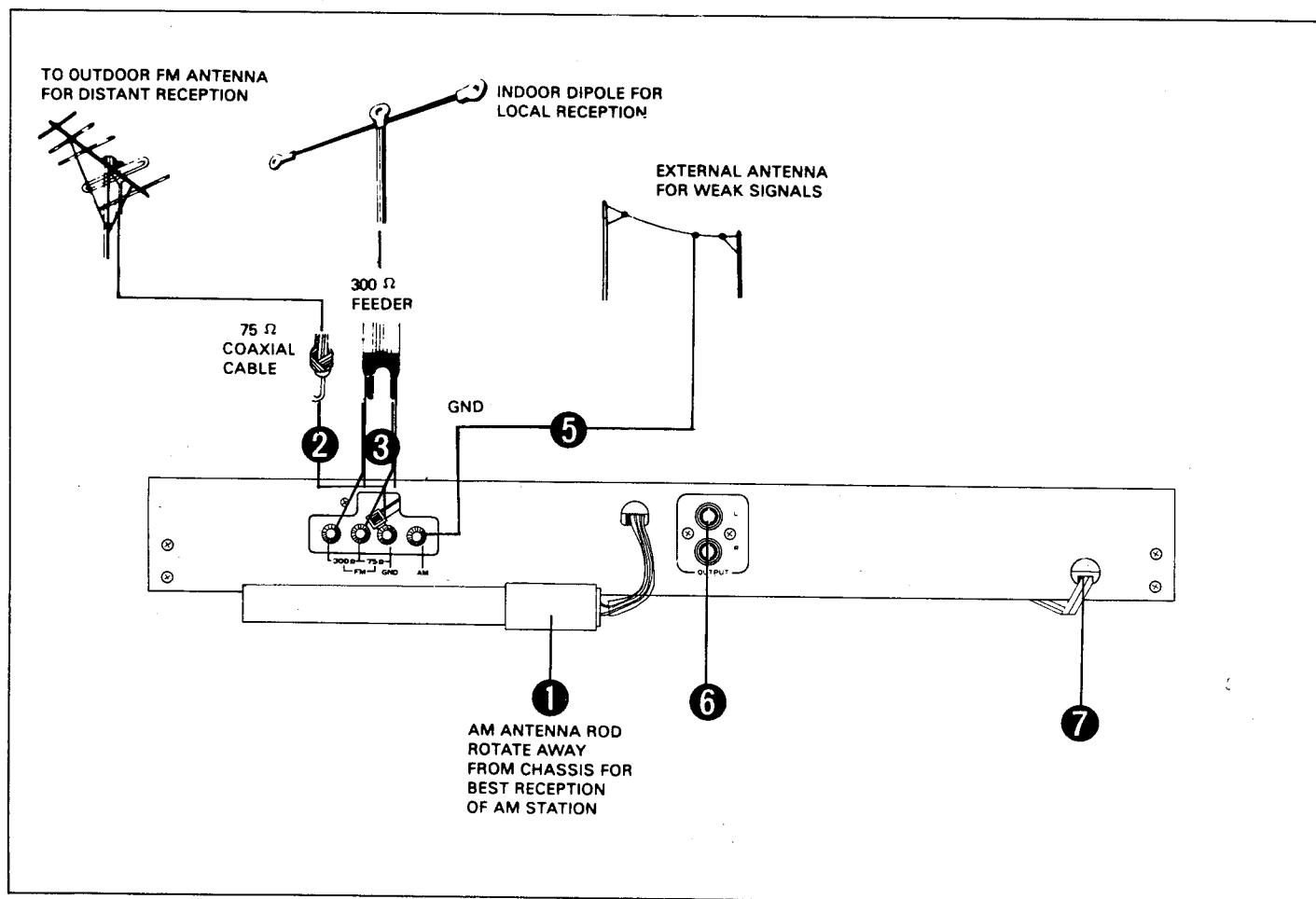
Your new high fidelity Tuner is designed to deliver maximum enjoyment and years of trouble free service. Please take a few moments to read this manual thoroughly. It will explain the features and operation of your Tuner and help insure a trouble free installation.

Please unpack your Tuner carefully. We recommend that you save the carton and packing material. They will be helpful should you ever need to move your unit and may be required if you ever need to return it for service. Your Tuner is designed to be placed in a horizontal position and it is important to allow at least two inches of space behind your unit for adequate ventilation and cabling convenience.

To avoid early damage, never place the unit near radiators, in front of heating vents, in direct sun light, or in excessively humid or dusty location.

Connect your complementary components as illustrated in the following section.

Rear Panel Connections



WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

1. AM FERRITE BAR ANTENNA

This Tuner comes with an AM built-in bar antenna. Rotate this bar antenna away from chassis for best reception of AM stations.

2. FM ANTENNA UNBALANCED CONNECTION

This connector is used for 60 to 75 ohm unbalanced coaxial cable connection.

3. FM ANTENNA BALANCED TERMINAL

This 240 to 300 ohm balanced input is used for standard TV twin lead connection. The dipole antenna provided with your Tuner should be adequate for local FM reception. Attach the antenna's arm horizontally to a non-metallic surface such as a window, a wall, or the rear surface of a cabinet or shelf. In general, the antenna is best positioned when it is as high as possible above floor level and its arms are perpendicular to the source of transmission. If you are located a considerable distance from FM transmitters or in a ferroconcrete building, an outdoor FM antenna may be required to reduce background noise, fading or interference.

4. AM GROUND TERMINAL

For best results when using an external AM antenna, the Tuner's chassis should be properly grounded and this is easily done by connecting this terminal to the nearest water pipe or metal conduit that goes to true ground.

5. EXTERNAL AM ANTENNA

In ferroconcrete buildings or in areas remote from broadcast stations, the built-in antenna may not prove adequate. To supplement the built-in antenna, connect 10 to 20 feet of insulated, flexible, single conductor wire to this terminal, but this wire should be kept away from all speaker cables and power cables and run in a straight line along a nonmetallic baseboard or under a rug.

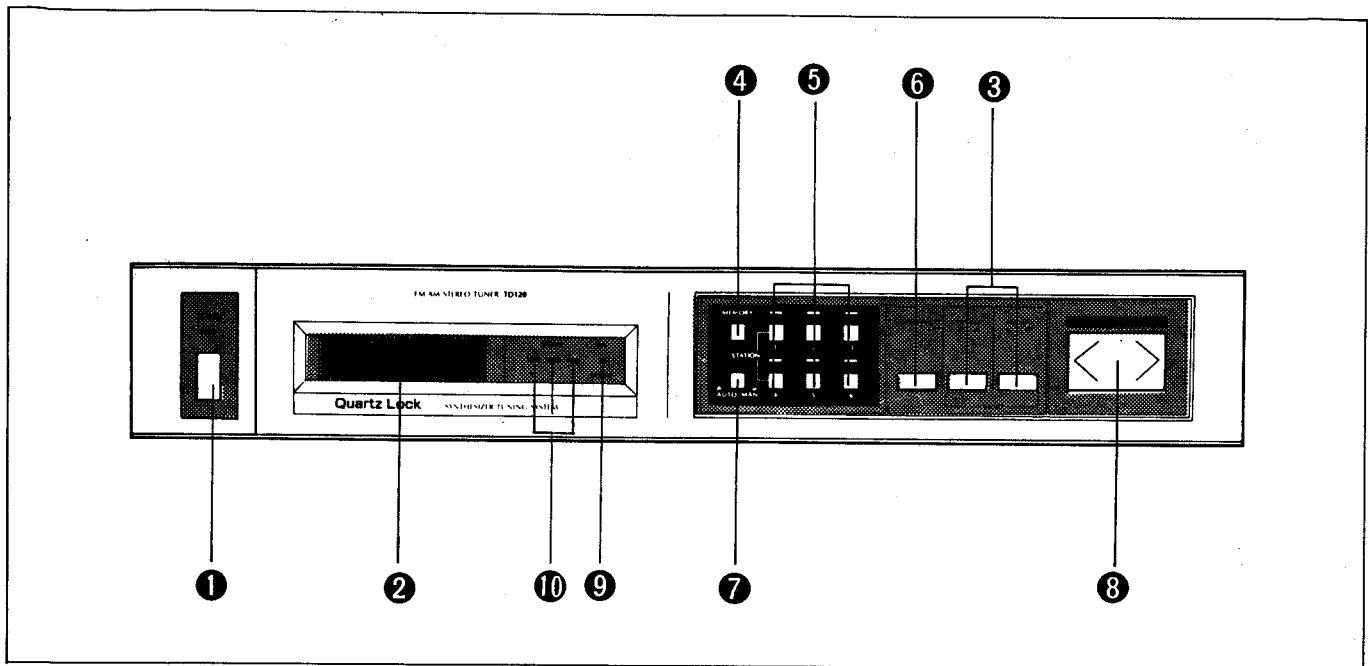
6. TUNER OUTPUT JACKS

These output jacks are for the connection between the Tuner and your matching amplifier. Connect one end of your leads to these output jacks and plug the other end to the TUNER inputs on your amplifier.

7. AC INPUT CORD

Plug this cord into AC outlet.

Front Panel Controls



1. POWER SWITCH & ITS INDICATOR

To turn the power ON or OFF, depress the POWER switch in or out.

2. FLUORESCENT DISPLAY

This fluorescent display indicates the station frequency for FM in MHz and AM in KHz.

3. FM/AM BAND SELECTOR

Push switch for selecting desired band; FM or AM.

4. MEMORY BUTTON

This button is used for entering the frequencies of FM and AM stations into each of 6 station memories (5). When you touch this button, MEMORY INDICATOR in the fluorescent display will light for 8 seconds and it allows you to enter the FM or AM station just displayed on the FREQUENCY DISPLAY (2) into any number of the STATION ADDRESSES (5) during this interval. For example, if you want to memorize the just displayed 100.10 MHz of FM station into STATION ADDRESS NO. 2, touch MEMORY button (4) first, (then MEMORY INDICATOR will light) and touch the STATION ADDRESS NO. 2 button in sequence, the MEMORY INDICATOR will come off immediately and the ADDRESS NO. 2 INDICATOR will come on, indicating that 100.10 MHz has been memorized into ADDRESS NO. 2.

In AM, the procedure is the same as the FM case except changing band to AM by pushing AM button (3).

5. STATION ADDRESS NO. BUTTONS & THEIR INDICATORS

This tuner enables you to memorize each of 6 stations for both FM and AM bands, totally 12 stations. These soft touch buttons are used for the MEMORY and RECALL of the FM and AM stations, and the relative indicators indicate that a station has been memorized or recalled. See OPERATION page for more details.

6. MONO/MUTE OFF SWITCH

This switch in pushed-out position will allow you to listen STEREO signal in FM mode and simultaneously suppress interstation hiss (MUTING-ON state). In this mode, the weak stereo FM reception will be switched to MONO mode automatically; if you wish to receive such stations in stereo, check the direction of FM antenna or an outdoor antenna may be required. In this mode, the desired weak or distant FM stations may be muted along with the hiss noise, too; if you wish to pick up such stations, push this switch (6) in to permit reception of the weak stations in the less noisy MONO mode and tune a desired station in MANUAL mode (7).

7. AUTO/MAN SWITCH

Switch for selecting the desired scanning mode with UP/DOWN (8) tuning button; AUTO or MANUAL scanning as indicated on the front panel. In AUTO operation, scanning is automatically continued up or downward until the next station is picked up with touching UP/DOWN tuning button (8). In MANUAL operation, the frequency display (2) is skipped by one channel up or downward from the just displayed frequency whenever UP or DOWN button is touched. If you keep depressing the UP/DOWN tuning button, skipping will automatically continue after a while until the UP/DOWN tuning button is released, or until the ends of band frequency are reached.

NOTE: REMEMBER THAT BOTH THE INTERVAL OF AUTO SCANNING AND SKIPPING IN MANUAL TUNNING IS;

BAND	USA version	Europe version
FM	0.1 MHz	0.05 MHz
AM	10 KHz	9 KHz

8. UP/DOWN TUNING BUTTON

To scan the tuning frequency up or downward from the just displayed frequency (2), touch the UP or DOWN button.

FM/AM band selector (3) and AUTO/MAN switch (7) are related with the UP/DOWN tuning mode.

9. FM STEREO INDICATOR

Automatically lights up when FM station broadcasts in STEREO. On weak or distant STEREO station, the TUNER is automatically switched into a MONO mode to reduce noise.

10. SIGNAL STRENGTH INDICATORS

Indicates relative signal strength of AM or FM stations. Useful in the orientation of antennas.

Operations

LISTENING FM BY AUTO SCANNING

1. Push POWER switch (1) in to turn on the power.
2. Push FM band selector (3).
3. Set MONO/MUTE OFF switch (6) to STEREO; pushed-out position.
4. Set AUTO/MAN (7) switch to AUTO; pushed-out position.
5. Touch UP or DOWN tuning button (8), then Auto scanning will stop at the next station.
6. Repeat touching UP or DOWN tuning button (8) until you get the broadcasting station you want.

LISTENING WEAK FM STATION

1. Push FM band selector (3).

2. Set MONO/MUTE OFF switch (6) to MONO; pushed-in position.
3. Set AUTO/MAN switch (7) to MANUAL; pushed-in position, then FM muting will be released to permit reception of the weak stations as the less noisy MONO mode.
4. Keep depressing UP or DOWN tuning button (8) until a desired weak station is picked up.

NOTE: If a weak desired station is skipped in AUTO scanning, we recommend you try to improve the antenna first (check the position and/or direction of your indoor dipole antenna or an outdoor antenna may be required). See item 3 of REAR PANEL CONNECTIONS.

LISTENING AM STATION

1. Push AM band selector (3).
2. Set AUTO/MAN switch to AUTO; pushed-out position.
3. Touch UP or DOWN tuning button (8), then AUTO scanning will stop at the next station.
4. Repeat touching UP or DOWN tuning button until a desired station is picked up.
5. For weak signal reception, set AUTO/MAN switch to MANUAL and repeat touching UP or DOWN tuning button.

HOW TO MEMORIZE (PRESET) & RECALL A STATION

1. Remember that this tuner enables you to memorize totally 12 stations; 6 stations for FM and another 6 stations for AM.
2. To memorize the desired FM stations, select maximum 6 frequencies from your desired stations, tune one by one either by AUTO or MANUAL tuning, touch MEMORY button (4) and STATION ADDRESS NO. 1 (5) in sequence for the first selected FM station. Repeat touching MEMORY button and STATION ADDRESS NO. buttons in sequence as your next selected station is tuned.
3. To memorize the desired AM stations, the procedures are the same as those of above FM case except change band to AM by touching AM button (3).
4. To recall the memorized stations, select the desired band (FM or AM) and then touch only the STATION ADDRESS NO. button to which you want to listen, then the memorized frequency will be displayed on the FREQUENCY DISPLAY (2) immediately.

Circuit Description

- Quartz PLL synthesized tuning system with full dynamic fluorescent display.
- Dual gate MOS-FET RF amplifier +3 section varactor diode front end, 2 pair matched linear phase IF ceramic filters, double tuned quadrature detector, PLL MPX demodulator with 19 KHz/38 KHz filters for FM circuitry.
- 2 section varactor diode and wide band ceramic filter for AM circuitry.
- Outstanding switching muting circuitry.

Specifications

FM SECTION

Tuning Range	USA Version: 87.5-108.00 MHz Europe Version: 87.50-108.00 MHz
Scanning Frequency interval (AUTO/MANUAL)	USA Version: 0.1 MHz Europe Version: 0.05 MHz
Usable Sensitivity IHF at S+N+D/N+D = 30 dB	2.0 μ V (11.2 dBf)
THD at 1 KHz, 100% MOD, Mono	0.12%
Stereo	0.15%
Stereo Separation at 1 KHz	50dB
Signal to Noise Ratio IHF Mono	75 dB
Stereo	70 dB
Frequency Response 20 Hz-15 KHz	+0.5/-1 dB
Audio Output Voltage, 1 KHz, 100% Mod	600mV
De-emphasis	USA Version: 75 μ Sec Europe Version: 50 μ Sec

AM SECTION

Tuning Range	USA Version: 520-1710 KHz Europe Version: 522-1611 KHz
Scanning Frequency interval (AUTO/MANUAL)	USA Version: 10 KHz Europe Version: 9 KHz
Usable Sensitivity IHF at S+N/N = 20 dB, Bar antenna	300 μ V/m
Signal to noise Ratio, 30% Mod ref.	45 dB
Audio Output Voltage, 400 Hz, 30% Mod	150mV
Power Consumption	11 Watts
Unit Dimensions (W x H x D)	440 x 70 x 200 mm
Unit Weight	4.7 Kg/10 Lbs. 6 ozs.

NOTE: Design and specifications subject to change without notice for improvements.

